WHAT IS CLAIMED IS:

1. A method of fabricating a conformal film on a substrate, the method comprising:

depositing a film of predetermined thickness on the substrate by performing a predetermined number of atomic layer deposition cycles in a processing chamber, each atomic layer deposition cycle comprising:

dosing the substrate with a precursor to establish a monolayer of the precursor on the substrate; and

dosing the substrate with a reactant to deposit an atomic layer deposition film; and

annealing the substrate after a predetermined number of atomic layer deposition cycles.

2. The method of Claim 1 wherein annealing further comprises plasma annealing the substrate.

3. The method of Claim 1 wherein annealing the substrate further comprises performing plural plasma anneals, wherein the frequency of the anneals controls the intrinsic film stress from tensile to compressive.

4. The method of Claim 1 wherein annealing the substrate further comprises performing plural plasma anneals, wherein the frequency of the anneals is determined to achieve a desired breakdown field strength.

5. The method of Claim 1 wherein the annealing further comprises plasma annealing in a reactive ambient.

6. The method of Claim 1 wherein annealing further comprises plasma annealing in a reactive ambient every 25 to 50 Å of deposition.

7. The method of 1 further comprising heating the substrate to a temperature sufficiently low so that the monolayer of precursor adsorbed on the substrate is not thermally dissociated.

8. The method of Claim 7 wherein the precursor comprises trimethylaluminum and the substrate is heated to a temperature within the range of between 60 degrees Celsius and 350 degrees Celsius.

9. The method of Claim 8 wherein the substrate temperature is approximately 150 to 200 degrees Celsius.

10. The method of Claim 1 wherein an atomic layer deposition cycle deposits a film having a thickness of approximately 0.8 Å.

11. The method of Claim 1 wherein the precursor comprises trimethylaluminum, the reactant comprises water and annealing further comprises annealing in a reactive ambient comprising oxygen.

12. The method of Claim 1 wherein the annealing comprises a rapid thermal anneal.

13. The method of Claim 1 wherein the annealing comprises an in-situ plasma anneal.

14. The method of Claim 13 wherein the plasma anneal comprises heating the substrate with an RF source in an Ar/O_2 ambient.

15. The method of Claim 1 further comprising maintaining a 50/500 dose to adsorption ratio.

16. The method of Claim 1 wherein:

dosing the substrate with a precursor further comprises flowing the precursor from a first zone of a multi-zone shower head; and

dosing the substrate with a reactant further comprises flowing the reactant from a second zone of a multi-zone showerhead.

17. A method for fabricating a thin AlO_x film on a substrate with a precursor and atomic layer deposition, the method comprising:

heating the substrate to a temperature so that precursor adsorbed on the substrate is not thermally dissociated;

performing plural atomic layer deposition cycles, each cycle comprising deposition of AlO_x by reacting a monolayer of precursor on the substrate with a reactant; and

annealing the AlO_x film in a reactive ambient at one or more predetermined film thickness.

18. The method of Claim 17 wherein the precursor comprises trimethylaluminum.

19. The method of Claim 18 wherein the substrate temperature comprises approximately 200 degrees Celsius or less.

20. The method of Claim 18 wherein the reactant comprises water.

21. The method of Claim 20 wherein the precursor flows from a first zone of a multi-zone showerhead and the reactant flows from a second zone of the multi-zone showerhead.

22. The method of Claim 18 wherein annealing further comprises annealing the AlO_x film approximately every 25 to 50 Å of thickness.

23. The method of Claim 18 wherein annealing comprises in-situ plasma annealing in a reactive ambient.

24. The method of Claim 23 wherein the reactive ambient comprises Ar/O_2 that oxidizes impurities associated with the AlO_x film.

25. The method of Claim 23 wherein the film comprises a gap layer for a thin film head.

26. The method of Claim 23 wherein the film comprises a tunnel barrier in a magnetic tunnel junction.

27. A microstructure having a thin AlO_X film fabricated using an atomic layer deposition process, the microstructure comprising:

a substrate coupled to the thin film, the thin film fabricated with plural atomic layer deposition cycles, wherein the thin film was subjected to at least one plasma annealing cycle after a predetermined number of atomic layer deposition cycles.

28. The microstructure of Claim 27 wherein each atomic layer deposition cycle deposits a film having a thickness of approximately 8 Å.

29. The microstructure of Claim 27 wherein the plasma anneal includes an in-situ plasma anneal performed in a reactive ambient.

30. The microstructure of Claim 27 wherein the atomic layer deposition cycle deposits a film with a precursor and a reactant, the precursor comprising trimethylaluminum and the reactant comprising water.

31. The microstructure of Claim 30 wherein the atomic layer deposition cycle further comprises a substrate maintained at less than approximately 200 degrees Celsius.

32. The microstructure of Claim 31 comprising a thin film magnetic head.